Exercise Solutions for Math 20

Factoring Polynomials and Simplifying Rational Expressions

Nile Jocson

November 8, 2024

Contents

1

Factor the following completely.

1.1

$16x^4 - 1$

$\Rightarrow (4x^2 - 1)(4x^2 + 1)$	Factor using difference of two squares.
$\Rightarrow (2x - 1)(2x + 1)(4x^2 + 1)$	Factor using difference of two squares. ■

1.2

$8j^3 - 125k^6$

$\Rightarrow (2j - 5k^2)(4j^2 + 10jk^2 + 25k^4)$	Factor using difference of two cubes. ■

1.3

$s^2 + 7s + 10$

$\Rightarrow (s + 2)(s + 5)$	Factor by grouping. ■

1.4

$4n^2 - 12n + 9$

$\Rightarrow 4n^2 - 6n - 6n + 9$ $\Rightarrow 2n(2n - 3) - 3(2n - 3)$ $\Rightarrow (2n - 3)^2$	Factor by grouping. ■

1.5

$x^3 - x^2 - x + 1$

$\Rightarrow x^2(x - 1) - 1(x - 1)$ $\Rightarrow (x^2 - 1)(x - 1)$	Factor by grouping.
$\Rightarrow (x - 1)(x + 1)(x - 1)$ $\Rightarrow (x - 1)^2(x + 1)$	Factor using difference of two squares. ■

1.6

$48 - 13q - q^2$

$\Rightarrow -q^2 - 13q + 48$	Rewrite in standard form.
$\Rightarrow -(q^2 + 13q - 48)$	
$\Rightarrow -(q - 3)(q + 16)$	Factor by grouping.
	■